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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,452	11/16/2001	Satoshi Aoyagi	SIW-022	5172

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EXAMINER

AUSTIN, MELISSA J

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/988,452	Applicant(s) AOYAGI ET AL.	
	Examiner Melissa Austin	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
4a) Of the above claim(s) 18-34 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-17 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 16 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group 1 in the reply filed on 3 January 2005 is acknowledged. The traversal is on the ground(s) that a single search would be required. This is not found persuasive because no specific reasons by which the requirement to restrict is in error are presented. The groups from which election was required are separately classified and of two statutory classes of invention; therefore, the restriction is proper because, "two or more independent and distinct inventions may not be claimed in one national application" (37 CFR 1.141).

The requirement is still deemed proper and is therefore made FINAL.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: SW, Sn1, Sn2, 14, 12.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "12" has been used to designate both a filter (Figure 5) and a compressor (page 18, ll. 7).

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "11" and "12" have both been used to designate compressor (page 18, ll. 6,7).

6. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be

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labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Information Disclosure Statement

7. The Information Disclosure Statement (IDS) filed on 14 January 2005 has been considered by the examiner.

Specification

8. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

9. The disclosure is objected to because of the following informalities:

- Pg. 3, ll. 16: "depends" should be "depend";
- Pg. 3, ll. 18: "depends" should be "depend";
- Pg. 6, ll. 24: "The" is misspelled;
- Pg. 7, ll. 26: "signals inputs" should be "signal inputs" or "signals input";
- Pg. 10, ll. 23: the formula: $V_{out}=V_{fc}-(R_{fc} \times I_{cap2})$ does not agree with the formula on the figures, which reads: $V_{out}=V_{fc}-(R_{fc} \cdot I_{cap2})$. Care should be taken with the mixing of these symbols (X and \cdot) because they denote different functions (cross product and dot product), and in many cases different results, in linear algebra. All other formulas should also be checked for this error;
- Pg. 15, ll. 27-28: there is a large space between, "shown ΔV " in Fig. 3." and "As a result, after". Also, on line 28, there is a strange symbol that appears to be a typographical error after "voltage drop";
- Pg. 21, ll. 28: there is a strange symbol that appears to be a typographical error after "electrical load";

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- Pg. 23, ll. 2: a space should be inserted after "cell" in "fuel cell1".

This list is not exhaustive.

Appropriate correction is required.

Claim Objections

10. A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim which depends from a dependent claim should not be separated by any claim which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

Claim Rejections - 35 USC § 112

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how the limitations regarding obtaining an excess supply amount of a reacting gas define, which read as a method, the fuel cell power supply unit, an apparatus. These limitations have not been given patentable weight.

13. Claim 1, 5-8, 17 recite the limitation "the variation of electrical load". There is insufficient antecedent basis for this limitation in the claim.

14. Claims 4-16 recite the limitation "said electric double layer capacitor". There is insufficient antecedent basis for this limitation in the claims. There is antecedent basis for "capacitor".

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15. Claims 5-16 recite the limitations "said reacting gas supply system", "the response time", and "the output assistance operation period" in lines 4 and 5 of the claim. There is insufficient antecedent basis for these limitations in the claims.

16. Claim 9-16 recite the limitation "the output assistance period". There is insufficient antecedent basis for this limitation in the claims.

17. Claim 17 recites the limitations "the input signals" and "the driving state". There is insufficient antecedent basis for this limitation in the claim.

18. Claims dependent from claims rejected under 35 USC 112, first and/or second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (5,964,309), in view of Singh et al. (6,572,993). Kimura teaches a power supply system with a stack of fuel cells connected to a storage battery. The reacting gases are supplied to the fuel cell in amounts based on the estimated output of the fuel cell, the charge of the storage battery, and the amount of power required by a load. The feed amount includes the amount required for providing the required power to the load and a feed adjustment based on the charge state of the storage battery. The storage battery may be charged by the fuel cell and/or supply energy to the load in addition to that supplied by the fuel cell (abstract, Figure 7). However, Kimura fails to teach a capacitor that is directly connected to the fuel cell. Singh teaches a system in which batteries and capacitors/supercapacitors (also known as double layer capacitor) are charged by a fuel cell and provide additional power to a load. The current-voltage characteristics of the fuel cell and of the energy storage device (whether it be a battery or capacitor)

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inherently depend on their respective internal resistances (Ohm's Law: $V=IR$). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made would have recognized the ability of a capacitor to perform the same function as the storage battery, as taught by Singh, in the fuel cell power supply system as taught by Kimura because batteries and capacitors are equivalent means to provide additional power to a load and to be charged by fuel cells.

21. Claims 5-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (5,964,309), in view of Singh et al. (6,572,993) and further in view of Suguira et al. (US 2002/0038732). Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Kimura and Singh teach the elements of claims 1-4 as discussed above and incorporated herein but fail to disclose response time of the reacting gas supply system shorter than the output assistance period of the capacitor. Suguira teaches that in case of a response delay in the output of a fuel cell, a battery may compensate for the shortage of electric power with respect to the required electric power of the load. The power generated by the battery gradually decreases as the output electric power of the fuel cell increases to approach the required electric power of the load. This control makes it possible to supply electric power with a high response. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the response time of the fuel cell/reacting gas supply system shorter than the output assistance operation period of the capacitor or set the capacitance of the capacitor such that the output assistance operation period is longer than the response time of the fuel cell/reacting gas supply system in order to supply electrical power with a high response.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Austin whose telephone number is (571) 272-1247. The examiner can normally be reached on Monday - Thursday, alt. Friday, 7:15 AM - 4:15 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mja


PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

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Art Unit 1745